

1 WHAT IS CLAIMED IS:

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3 1. A biodegradable wellbore fluid comprising a first synthetic internal olefin having
4 from 16 to 18 carbon atoms (C_{16-18} IO), a second synthetic internal olefin having between
5 15 to 18 carbon atoms (C_{15-18} IO), and a third synthetic internal olefin having 15 to 16
6 carbon atoms (C_{15-16} IO).

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8 2. The wellbore fluid of claim 1 wherein the first internal olefin is present in a range
9 of about 40 to about 60 percent by weight of the wellbore fluid and wherein the second
10 internal olefin is present in range of about 15 to about 40 percent by weight of the
11 wellbore fluid and wherein the third olefin is present in range of about 10 to about 30
12 percent by weight of the wellbore fluid.

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14 3. The wellbore fluid of claim 1 further comprising a C_{16} alpha olefin (C_{16} AO).

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16 4. The wellbore fluid of claim 3 wherein the C_{16} alpha olefin (C_{16} AO) is present in
17 the range of about 10 to about 20 percent by weight of the wellbore fluid.

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19 5. The wellbore fluid of claim 1 further comprising a non-oleaginous phase.

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21 6. The wellbore fluid of claim 5 wherein said non-oleaginous phase comprises from
22 about 1% to about 70% by volume of said fluid.

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24 7. The fluid of claim 6 wherein said non-oleaginous phase is selected from the group
25 consisting of fresh water, seawater, a brine containing organic or inorganic dissolved
26 salts, a liquid containing water-miscible organic compounds, and combinations thereof.

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28 8. The wellbore fluid of claim 1 further comprising a weighting agent, wherein the
29 weighting agent is selected from the group consisting of calcium carbonate, dolomite,
30 siderite, barite, celestite, iron oxides, manganese oxides, ulexite, carnalite, sodium
31 chloride and combinations thereof.

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- 2 9. A method of formulating the continuous phase of a hydrocarbon based drilling
- 3 fluid, the method comprising:
- 4 determining the toxicity of a selection of hydrocarbon components;
- 5 determining the biodegradability of the selection of hydrocarbon components;
- 6 determining the polycyclic aromatic hydrocarbon content of the hydrocarbon
- 7 components
- 8 blending the selection hydrocarbon components in a manner which produces a
- 9 hydrocarbon based drilling fluid that has a toxicity score of ≤ 1 and has a biodegradation
- 10 rate ratio ≤ 1 .
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- 12 10. The method of claim 9 wherein the selection of hydrocarbons is selected from the
- 13 group consisting of a first synthetic internal olefin having from 16 to 18 carbon atoms
- 14 (C_{16-18} IO), a second synthetic internal olefin having between 15 to 18 carbon atoms (C_{15-18}
- 15 IO), and a third synthetic internal olefin having 15 to 16 carbon atoms (C_{15-16} IO) and
- 16 mixtures thereof.
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- 18 11. The method of claim 9, wherein the selection of hydrocarbons is selected from the
- 19 group consisting of a first synthetic internal olefin having from 16 to 18 carbon atoms
- 20 (C_{16-18} IO), a second synthetic internal olefin having between 15 to 18 carbon atoms (C_{15-18}
- 21 IO), a third synthetic internal olefin having 15 to 16 carbon atoms (C_{15-16} IO) and an
- 22 alpha olefin having 16 carbon atoms (C_{16} AO) and mixtures thereof.
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- 24 12. The method of claim 9, wherein the selection of hydrocarbons are selected from the
- 25 group consisting of a C_{16-18} IO having a C_{16} isomer content of greater than 50% w/w and
- 26 a C_{18} isomer content greater than 30% w/w; a C_{15-18} IO having a C_{15} isomer content of
- 27 greater than 20% w/w; a C_{16} isomer content greater than 20%; a C_{17} isomer content
- 28 greater than 20%; and a C_{18} isomer content greater than 15% w/w; a C_{15-16} IO having a
- 29 C_{15} isomer content of greater than 40% w/w and a C_{16} isomer content greater than 40%
- 30 w/w; a C_{16} alpha olefin having a C_{16} isomer content of greater than 90% w/w; and
- 31 mixtures thereof.

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13. A method of formulating a wellbore fluid, the method comprising blending a first synthetic internal olefin having from 16 to 18 carbon atoms (C_{16-18} IO), a second synthetic internal olefin having between 15 to 18 carbon atoms (C_{15-18} IO), and a third synthetic internal olefin having 15 to 16 carbon atoms (C_{15-16} IO) to form said biodegradable wellbore fluid.

14. The method of claim 13 further comprising blending an alpha olefin having 16 carbon atoms (C_{16} AO).

15. A method of drilling a well comprising, attaching a cutting bit to a length of drill pipe, rotating said cutting bit, removing cuttings from around said bit with a drilling fluid wherein the drilling fluid is a biodegradable wellbore fluid which comprises a first synthetic internal olefin having from 16 to 18 carbon atoms (C_{16-18} IO), a second synthetic internal olefin having between 15 to 18 carbon atoms (C_{15-18} IO), and a third synthetic internal olefin having 15 to 16 carbon atoms (C_{15-16} IO).

16. The method of claim 15, wherein the well bore fluid further comprises an alpha olefin having 16 carbon atoms (C_{16} AO).

17. The method of claim 15, wherein the C_{16-18} internal olefin has a C_{16} isomer content of greater than 50% w/w and a C_{18} isomer content greater than 30% w/w; wherein the C_{15-18} IO has a C_{15} isomer content of greater than 20% w/w; a C_{16} isomer content greater than 20%; a C_{17} isomer content greater than 20%; and a C_{18} isomer content greater than 15% w/w; and wherein the C_{15-16} IO has a C_{15} isomer content of greater than 40% w/w and a C_{16} isomer content greater than 40% w/w.

18. The method of claim 16, wherein the C_{16} alpha olefin has a C_{16} isomer content of greater than 90% w/w.